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ABSTRACT

This report contains the synthesis of Research on Instructional Effectiveness in Elementary Schools (RUETE). The emphasis of the research fellows was on large scale, classroom-based studies related to student achievement. Current research in the areas of active teaching behaviors, activity and task stuctures, and academic learning time is discussed. A detailed description is provided of the design of the two phases of the RUETE study. Following a brief overview of research on teaching behaviors, key elements of research on activity structure in the classroom are described. These include: (1) content of instruction; (2) group size and composition; (3) division of labor; (4) student control; (5) student evaluation; and (6) student advancement. A discussion is also presented of research findings on academic learning time. References to the synthesized research studies are provided. (JD)

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FAR WEST LABORATORY
FOR EDUCATIONAL RESEARCH AND DEVELOPMENT

SYNTHESIS OF RESEARCH ON INSTRUCTIONAL EFFECTIVENESS IN ELEMENTARY SCHOOLS

Applying Research to Teacher Education: Research Utilization in Elementary Teacher Education Project

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OVERVIEW OF THE STUDY

In 1983 the National Institute of Education (NIE) funded the Far West Laboratory for Educational Research and Development (FWLERD) to conduct a study, Applying Research to Teacher Education (ARTE). The purpose of the ARTE study is to develop techniques for better exposing student teachers to current research on effective instruction and effective schools.

The ARTE study is composed of three major research activities aimed at improving: (a) research utilization in elementary teacher education, (b) conditions of secondary mathematics and science teacher education; and (c) preservice training of middle/junior high school teachers. The research utilization in elementary teacher education (RUETE) project is the focus of this document.

This report contains the Synthesis of Research on Instructional Effectiveness in Elementary Schools as it pertains to the RUETE research activity. The areas of effectiveness research on which this document concentrates were selected by the RUETE study's team of research fellows. The emphasis of the research fellows was on large scale, classroom-based studies related to student achievement. Thus this report discusses current research in the areas of active teaching behaviors, activity and task structures, and academic learning time.

The remainder of this overview will describe in greater detail the design of the RUETE research activity.

Design of the Research Activity

The Research Utilization in Elementary Teacher Education (RUETE) project of the ARTE study draws upon research on effective instruction with the aim of improving teacher education. The design and implementation of this two-year study integrates (a) the application of research on effective instruction, (b) the utilization of processes of adult learning in a systematic manner, and (c) the development of teacher education academies.

FWLERD, in conjunction with the staffs of preservice elementary teacher education programs at three regional institutions of higher education, is applying some 10 years of research on teaching in elementary schools to build preservice teacher trainees' knowledge and skills in the areas of effective classroom instruction. The application of research is occurring through a process of collaborative inquiry, using the Interactive Research and Development on Teaching (IR&DT) model developed at FWLERD. The IR&DT model recognizes three essential characteristics of collaborative research: (a) the establish-

ment of parity, or mutual respect, among collaborators, (b) the maintenance of reciprocal relationships among team members representing different professional roles, and (c) the establishment of a common language (Tikunoff & Mergendoller, 1983). The overall goal is for the individuals in the collaborative team to work together in investigating educational problems that are of interest to all the team members. The IR&DT central theme of collaborative inquiry provides knowledge about and experience in solving problems in concrete and directly relevant professional situations.

The RUETE study's collaborating participants are involved at two major levels: the Regional Teacher Education Team (RTET) level and the Teacher Education Academy (TEA) level. Experiences at these two levels include two years of field activities. Engaging teacher education personnel in a RTET for collaborative research purposes together with engaging education personnel themselves in the academies provides a forum of multiple perspectives. It is expected that the academy network system will facilitate communication and result in long term collaboration for effective instruction and school improvement.

The first phase of the study (from December 1982 to November 1983) is designed to establish a RTET, incorporate recent research findings from elementary school effectiveness studies into the preservice elementary school teacher education process and to initiate the teacher education academies. The second phase (from December 1983 to November 1984) proposes to concentrate on more fully developing the academies, which are the cornerstone of both phases. These teacher education academies will (a) understand the content of classroom effectiveness research, (b) engage in collaborative inquiry, (c) identify identify the present and future staffing needs of the school districts, (d) analyze classroom instruction, and (e) apply instructional tional research to classroom instructional problems.

Phase I

In its first phase, the study selected and convened a Regional Teacher Education Team (RTET), consisting of experienced teacher educators from these institutions:

- University of Utah, Salt Lake City (Amy Driscoll, Regional Research Fellow), in collaboration with the Salt Lake City School District;
- University of Nevada, Reno (Kenneth Johns, Regional Research Fellow), in collaboration with the Washoe County School District; and
- Mills College, Oakland, California (Richard Ponzio, Regional Research Fellow), in collaboration with the Vallejo City Unified School District.

The team collaboratively examined the consistent patterns of research findings about effective instruction and successful elementary schools and employed those findings in analyses of classroom situations. The collaborative process provided the elements and experiences of the Interactive Research and Development on Teaching (IR&DT) model. The examination of research findings included reviewing, discussing, elaborating on, and interpreting major aspects of instructional effectiveness research at the elementary school level.

In order to analyze classroom situations RTET members undertook several structured activities through which they examined the application of instructional effectiveness research findings to their instruction of preservice teachers. The team used a variety of observation instruments and techniques to collect information on and analyze the classrooms of effective elementary school instructors. The structured activities enabled each member of the team to generate a document synthesizing the data from their own teacher education program.

The three RTET members are developing plans for using the research findings at their individual sites. Each of the three plans will incorporate elements characteristic of the particular site and drawn from the university, school district, and community levels. Those elements will include aspects of the teacher education program, the preservice teachers, state certification requirements, and the recruitment and hiring criteria for local education work forces.

Comprehensive plans to form and establish a TEA at each site are also being developed by each RTET member. Specific TEA membership and programs of activity will be determined by the RTET through collaboration with the student teachers, cooperating teachers, and teacher education faculties. Each plan will be a guide based on needs, goals, and objectives and including suggested activities and resources. It is expected that team members' understanding of the procedure, the functions of each element of the plan, and applicability will be appropriately adapted for use at each of the sites.

Phase II

The second phase will consolidate the establishment of the RTET and the teacher education academies by building on the work from Phase I.

FWLERD will monitor and support the Phase II activities through assistance in planning and analyzing, developing resources, providing presentations, and training. The timing and actual design of the monitoring and support activities will depend upon considerations at each site and upon the structure of the particular TEA being instituted.

The conceptual approach toward the RUETE project represents an interactive research development, dissemination, and implementation procedure that engages both teacher educators and local education personnel in the development of teacher education programs tailored to meet regional or local school needs.

Summary

The Research Utilization in Elementary Teacher Education (RUETE) research activity organized a Regional Teacher Education Team (RTET) to redesign, implement, and evaluate elementary teacher training incorporating the findings of effective instruction and effective school improvement research. RUETE is also developing a teacher education academy (TEA) at each of three sites. FWLERD research on teaching in elementary schools regarding effective classroom management, effective classroom instruction, the language demands of the classroom, teacher decision making, student participation in instructional activities, effective use of time by teachers and students, and the effects of various grouping practices will be applied in a collaborative manner with the staffs of preservice elementary teacher education programs at universities in California, Nevada, and Utah. The TEA will utilize education personnel at each site to outline procedures and processes for analyzing the extent to which teachers with varying years of teaching experience actually use and apply the strategies and knowledge that have been shown to result in better learning outcomes for elementary students. This integration of the application of research on effective instruction with the processes of adult learning is expected to result in long term collaboration for effective instruction and school improvement.

SYNTHESIS OF RESEARCH ON INSTRUCTIONAL EFFECTIVENESS IN ELEMENTARY SCHOOLS

The Research Utilization in Elementary Teacher Education (RUETE) project is investigating ways to increase the use of current educational research in the preservice stage of elementary teacher training. The RUETE project is focusing on (a) encouraging an awareness among student teachers and teacher educators of existing research on effective instruction and (b) examining the process of applying educational research in teaching practice.

The purpose of this synthesis of research regarding effective instruction is to describe those areas of the research considered applicable to the RUETE project. It will not present an exhaustive review of the current research. (See Barnes, 1981, for a review of effective instruction research.) The areas of concentration addressed in this synthesis were determined by a team of research fellows, representing the three participating study sites, in collaboration with researchers from the Far West Laboratory for Educational Research and Development (FWLERD).

The collaborative team agreed that

> Effective instruction includes those teaching behaviors that result in intended positive changes in student attitudes and participation in instruction (e.g., engagement, accuracy, task completion, and obtaining feedback). Operationally defined in terms of this project, effective instruction includes teaching strategies that increase academic learning time (ALT), and variation in activity and task structure (e.g., grouping practices). (Gee, 1983)

Discussions of this definition of effective instruction in the light of existing research suggested that the team concentrate on research on teaching behaviors that are tied to student achievement, and on activity and task structures. Interest in these areas led to the inclusion of research on academic learning time (ALT) as a measure of student achievement. All three research areas--teaching behaviors, activity structures, and academic learning time--will be examined here.

It should be noted that, despite its importance, research on effective classroom management is beyond the scope of this document and will not be discussed here. It should be acknowledged, however, that classroom management and instruction are interrelated and that researchers have written extensively about ways in which effective teachers establish and carry out their management plans (Evertson,

Anderson, & Emmer, 1980; Evertson, Emmer, Clements, Sanford, Worsham, & Williams, 1981). Clark and Yinger, 1980, reviewed the research on the planning and pacing of appropriate instruction.

The following synthesis of selected effective instruction research will first offer a framework for examining the research areas to be discussed and then describe each of the three areas: teaching behaviors, activity structures, and academic learning time.

The Framework

During the late 1960's and 1970's, research on instructional effectiveness grew rapidly in volume and sophistication, focusing on the teaching of basic skills at the elementary school level. By the end of the 1970's, reviews and syntheses of the research in elementary schools indicated that a pattern of effective instruction was emerging. In reviewing the cumulative effect of this body of research, Brophy (1979) noted that:

> The past several years have been exciting and gratifying for classroom researchers concerned with process-product (outcome) relations, because a coherent body of knowledge linking teacher behavior to student achievement and (to an extent) attitudes has begun to emerge. (p. 733)

The research done in the past ten years has negated the impression commonly held by teachers that effective instruction is "purely an art" rather than partly an applied science, and that "you have to find out what works best for you" (Brophy, 1982). Instead, researchers have developed clear and specific information about how successful teachers manage their classrooms, such as how they get off to a good start at the beginning of a school year. This research has shown that effective teachers can systematically create successful learning environments in their classrooms and prevent or cope with most of the problems that students may present (Brophy, 1982). The methods used by effective teachers represent an orchestration of a large number of instructional, managerial, diagnostic, and therapeutic skills tailored to meet specific contexts and student needs (Brophy, 1979).

Furthermore, research has shown that such techniques for effective instruction not only can be taught to teachers but also result in significant gains in student achievement. Using materials grounded in research, several teacher training experiments have been conducted (Anderson, Evertson, & Brophy, 1979; Crawford, Gage, Corno, Stayrook, Mitman, Schunk, Stallings, Baskin, Harvey, Austin, Cronin, & Newman, 1978; Good & Grouws, 1979; Stallings, Needels, & Stayrook, 1979). The training procedures ranged from a series of two-and-a-half hour training sessions with observations and feedback to detailed lists of recommendations. Notably, in every experiment, all teachers changed their behavior and student achievement was significantly improved (Stallings, 1983).

Tikunoff (1982) discussed the interactive and recursive relationships between teaching behaviors and student achievement, in particular with regard to the ways in which the relationships are reflected in improved academic learning time (ALT). In his framework for examining effective instruction, Tikunoff described four clusters of teaching behaviors necessary for effective instruction: communicating clearly, obtaining and maintaining engagement, monitoring progress, and providing immediate feedback. Students, on the other hand, must respond appropriately to these behaviors in order to be perceived by the teacher to be participating competently in instruction. Tikunoff stated that, in order to participate competently, students need to perform three tasks: decode and understand expectations and new information; participate productively by maintaining engagement, completing tasks with high accuracy, and observing norms; and obtain feedback concerning the success of their task completion.

In addition to exhibiting certain active teaching behaviors, successful teachers, as described by Tikunoff, must also organize instruction effectively and "mediate" instruction so that students can participate competently. The effective organization of instruction requires that the teacher fit the intended learning into the appropriate task structure (such as whole group or small group) so that the organization itself creates, communicates, and reinforces task and institutional demands. The organization of instruction reflects a teaching strategy that allows the nature of the task structure to fit instructional demands. Research on task structures stems from applying concepts of organizational sociology to problems of classroom order (Cohen, Intili, & Robbins, 1979). Since instruction involves many different kind of objectives, not all objectives can be achieved by using the same pattern of classroom task organization. Effective teachers know how to shift the patterns of task and activity structures to best fit the intended learning and to meet the varying needs of different students.

The description of effective instruction as involving active teaching behaviors, organization and mediation of instruction, and the understanding, engagement and successful task completion of students carried Tikunoff's discussion into the area of academic learning time or ALT. ALT is a measure of student learning-as-it-occurs that was developed in research at Far West Laboratory (Fisher, Berliner, Filby, Marliave, Cahen, & Dishaw, 1980). ALT is defined as the time a student spends in a particular content area engaged in learning tasks with a high degree of accuracy. ALT has been found to correlate strongly with student achievement. It therefore seems logical that ALT would also strongly correlate with effective instruction.

This framework has outlined the areas of effective instruction research that the RUETE collaborative research team determined were relevant to the study of research utilization in elementary teacher education: (a) teaching behaviors, (b) activity structures, and (c) academic learning time. The following discussion will more fully review the research in those three areas.

Teaching Behaviors

Research on teacher effectiveness has helped to identify patterns of teacher behavior that are clearly effective in producing student achievement gains. The findings that will be reported here are the result of many hours of classroom observation of teachers who have been considered effective based on their track records in student achievement gains.

One pattern of instruction that has been identified as effective in producing greater student achievement has been referred to as "direct instruction" (Berliner, 1979; Brophy, 1979; Rosenshine, 1979) or "active teaching" (Good, 1979). When using these terms, researchers are seeking to describe a sequence of practices where the teacher is clearly the instructional leader, actively engaging the students in academic pursuits, as opposed to merely serving as a resource for students who acquire their own learning through independent activities. Since the term "active teaching" seems less loaded with implications than "direct instruction," "active teaching" will be used as the referent in this review. In active teaching:

> The teacher places a clear focus on academic goals (Rosenshine, 1979); the teacher is task focused, spending most of the instructional period on the subject rather than socializing (Good & Grouws, 1979; Rosenshine, 1979).
>
> The teacher presents information actively and clearly (Good & Grouws, 1979); structures instruction by reviewing, outlining, explaining, summarizing (Tikunoff, Berliner, & Rist, 1975); and promotes extensive content coverage (Filby & Cahen, 1978; Rosenshine, 1979).
>
> The teacher promotes high levels of student involvement in classroom tasks (Rosenshine, 1979), keeping student engagement rates high, thus maximizing learning time (Fisher, Filby, Marliave, Cahen, Dishaw, Moore, & Berliner, 1978).
>
> The teacher checks students understanding of new knowledge before assigning practice activities (Stallings & Kaskowitz, 1974; Stallings, 1983; Brophy & Evertson, 1976), looked for ways to confirm or disconfirm that their presentations were understood by students, assumed responsibility for student learning, and were ready to reteach when necessary (Good, 1983).
>
> The teacher feedback is immediate and academically oriented (Filby & Cahen, 1978; Rosenshine, 1979), tending to be basically nonevaluative, i.e., showing little praise and criticism (Anderson et al., 1979; Good & Grouws, 1979).

> The teacher creates a relaxed learning environment (Good & Grouws, 1979; Fisher et al., 1978), but one which is businesslike and at the same time convivial (Tikunoff et al., 1975). (Tikunoff, Ward, Fisher, Armendariz, Parker, Dominguez, Vazquez, Mercado, Romero & Good, 1980)

The two basic ingredients of active teaching are: teacher-directed learning and a high level of teacher-student interaction. As stated above, teachers who have been trained to use these instructional behaviors have produced greater student achievement gains. While Good acknowledges that these findings can lead to higher student achievement, he uses the concept of active teaching as a vehicle for analyzing instruction, not as a prescribed set of teaching behaviors (1983a). This view of the teacher reflects a rational decision-maker, who consciously chooses to use effective instructional strategies, rather than an automaton who imitates prescribed modes of behavior.

Active teaching represents a broad philosophical base, which can occur in a variety of activity structures, and should be less direct as students become more mature (Good, 1983). This style of teaching can also be inductive or deductive and can be used to describe both teacher-led instruction and student-team learning instruction. Good summarizes the characteristics of teachers who obtained high student achievement test scores as teachers who:

> Gave meaningful and clear presentations of what was to be learned, provided developmental feedback when it was needed, structured a common seatwork assignment, and responded to individual students' needs for help. These teachers presented meaningful content, but they also seemed to listen to and learn from student responses (e.g., reteaching when student performance indicated the need). Effective teachers also encouraged students to participate actively and to initiate academic questions when appropriate. Indeed, these teachers were helping students to be active learners. (Good, 1983, p.3)

Recent teacher effectiveness research has provided clear evidence that teachers do make a difference in student learning. Besides the inservice training programs cited in the beginning of this review, Gage and Gioconda (1981) provide a particularly good review of four field experiments demonstrating that relatively inexpensive inservice teacher education programs can lead to changes in teacher behavior that result in higher student achievement gains.

Stallings has also developed a training program using ALT as the framework. The program grew out of a study of secondary remedial reading classes (Stallings et al., 1979) in six northern California school districts. The study showed that students made greater reading achievement gains in classes where teachers spent more time instructing, providing supportive feedback, and having

students read aloud. These successful teachers were closely involved with their students during the entire class. In a study of secondary classrooms, Stallings and Mohlman (1981) found that if teachers increase their interactive academic time (active teaching) to approximately 50 percent of a class period, and hold constant the monitoring of seatwork to about 35 percent, student learning increases.

Stallings' program consists of pre-training observations that provide feedback to teachers about their need for improvement on classroom behavior variables that Stallings found to be related to achievement in secondary reading classes. Five weekly two and-a-half hour workshops on scheduled topics follow, where teachers discuss the information given and commit themselves to work on classroom behaviors and strategies needing improvement, as pinpointed in their observation profiles. One month after the training is ended, post-training observations are conducted. The resulting observation profiles are presented and discussed in a final workshop. A description of how the Stallings model was adapted and implemented with 29 junior high teachers in the District of Columbia Public Schools was documented in a series of papers presented at the 1983 annual meeting of the American Educational Research Association (Anderson, 1983; Bush, 1983; Thieme-Busch & Prom, 1983; Bethune, 1983).

Good, Grouws, and Ebmeier (1983) also richly described how experimental classes with teachers trained in the active teaching model consistently reported higher student gains in achievement. In contrast, control group teachers evidenced lower student gains. These control group teachers tended to rely much more on seatwork activities, and often their students worked without good conceptual understanding of what they were doing and why. In some cases teachers did not provide adequate procedual directions for seatwork and appeared to ignore signals that students did not understand the subject matter or what was expected.

In a report about the effectiveness of the Missouri Math Program (1983a) Good qualified his success story. While it was clear that experimental groups did better than the control groups, the magnitude of the differences were more evident for some student and teacher combinations than for others. It also appeared that the classroom organizational structure interacted with the effects of the instructional treatment (Ebmeier, Good, & Grouws, 1980). The results of these reports suggest that more research is needed in the quality of active teaching. This includes more research on the nature of subject matter development, as well as data on how students think about and receive teacher instruction. (For a review of student perceptions, see Weinstein, 1983.) Moreover, the research by Bossert (1977, 1978) has demonstrated that the nature of the task structure can influence student learning.

Despite its need for further research, active teaching appears to be an important aspect of effective teaching with significant implications for teaching practice.

Activity Structure

The terms "activity structure" and "task structure" carry a variety of connotations in the educational research literature. For example, Bossert (1977) coined the term "activity structure" as the relationship between a task and the way it is accomplished, while Doyle (1979) used "task structure" to refer to the cognitive demands of a particular task. Since the regional research fellows of the ARTE: RUETE project refers to "variation in activity and task structure (e.g., grouping practices)" in their definition of effective instruction, the term "activity structure" will be used as a referent in this review. Special attention will be given to the grouping dimension of the activity structure.

As stated earlier, research on activity structures has grown out of an attempt to apply concepts from organizational sociology to problems of classroom order. The following definition of classroom order is offered as a frame of reference.

> Order is the situation where there is a set of clear expectations for all classroom members, where people can anticipate how others will behave, where people feel that it is right and proper for everyone to confirm to these expectations, and where there is a high degree of conformity to the expectations. (Cohen et al., 1979, p. 119)

If there is irregularity in the way people behave and the knowledge of what is expected of them, the result can be a confusing situation which is incompatible with learning.

Cohen and her colleagues (Cohen et al., 1979) specified three key problems that must be solved for learning to take place: commitment, order and, critical to this discussion, the design of the learning task. The issue of fitting the classroom organizational structure to the intended learning is difficult for the teacher because there is no definitive, generally accepted way to design learning tasks to facilitate learning. Securing commitment from students, establishing order, and determining the nature of the task are interrelated problems. If any one of the problems is unresolved, there will be repercussions for the others (Cohen et al., 1979).

Preservice teachers are faced with many decisions when they determine how to best match intended learning with an instructional structure: First, they must design the learning task; second, they must decide what organizational structure to use to accomplish the task; third, they must establish routines for classroom order so that learning can occur; and fourth, they must gain the commitment of the students to complete the task. The following discussion examines research findings concerning the nature of classroom activity structures and grouping practices that are designed to help teachers cope with some of these decisions.

Reflecting on the ideas of John Dewey and Marshall McLuhan, Postman and Weingartner (1969) wrote:

> A classroom is a learning environment and . . . the way it is organized carries the burden of what people will learn from it. . . . The critical content of any learning experience is the method or process through which the learning occurs. (pp. 18-19)

Within such a framework, the notion of activity structures provides an important insight for the study of classroom organization. According to Bossert, activity structures include the following criteria:

1) The modes of behavior that constitute the activity itself (e.g., what the teacher does, what students are expected to do, the number of different tasks);

2) The reward structure embodied in the activity (e.g., how a student learns success or failure, how critiquing students' performance is communicated by the teacher, publicly or privately);

3) The sequencing of rewards or punishments in relation to behavior (i.e., the system of evaluation used by the teacher and how public it is);

4) The collective character of the activity (e.g., number of people involved, internal division of labor; choice of behavioral options); and

5) The nature of social relations in an activity (e.g., the amount of talking allowed, the amount of mobility allowed, the general level of opportunity for social interaction). (Bossert, 1978, pp. 11-12)

Although Bossert's activity structure criteria related primarily to teacher behaviors and social relationships among students, three dimensions of the activity structures he identified illustrate how these criteria come together to form various types of classroom organization. These are recitation, class tasks, and multitask structures. Each is described below drawing on Bossert's (1978, 1979) discussion and the five criteria listed above, which are referenced by number.

Recitation is a familiar activity structure in most classrooms. In recitation, the teacher poses questions, the students sit listening, raise their hands when they want to be called upon, and give answers to the questions publicly (Criterion 1). Because a student's answer is public, everyone in the class knows when the question is answered correctly or incorrectly regardless of whether a teacher uses a formal system of rewarding correct answers (Criterion 2). Repeated successes with correct responses, repeated failure with in-

correct responses, and the reaction both of the teacher and other classmates, will determine to a great degree the responses of a student to the activity (Criterion 3). Recitation is by and large a whole class activity, but students are expected to speak only when called upon (Criterion 4). Finally, there is little opportunity for interaction among students in the activity, and since repetition of similar recitations for a given subject reveals who knows the answers and who does not, all performances can be compared by teacher and students, and such judgments can affect subsequent social interaction (Criterion 5).

Class tasks include assignments to the entire class that students are expected to accomplish at their seats independently, although some teachers may allow students to work together (Criteria 1 and 4). Performance is less public and, depending on how the teacher structures assessing assignments and monitoring students' work, a student's achievement is likely to remain private (Criteria 2 and 3). If students are asked to work independently, little opportunity exists for social interaction; if they are allowed to work in groups, social relations are apt to result (Criterion 5).

Multitask as an activity structure differs from class tasks primarily in the degree of freedom of choice allowed to students (Criteria 4 and 5). Thus, in a multitask activity structure, the class would be provided simultaneously a variety of possible activities and students would be provided the option of choice. They might choose to work independently or with others (Criteria 1 and 4), and their performance is made public only to the degree that they choose to make it so (Criteria 2 and 3). Interactions among students may take place (Criterion 5) and the teacher must devise a system for assessing and monitoring student progress (Criterion 3).

Bossert (1977) used this framework when he did research on the relationship between activity structures and teachers' use of different strategies for maintaining order. In an intensive observational study of four elementary school classrooms, Bossert found that task organization greatly influenced the types of control exercised by teachers. Two of the classrooms observed were characterized by frequent use of recitation and seatwork, while the other classrooms used multitask configurations. In the two classrooms characterized by use of whole-class work, teachers exerted more energy in using desists and maintaining order than the two teachers whose classes were characterized by use of multiple task configurations. Moreover, the desists were more public in whole-class situations than they were within the small group structure. Bossert, however, did not attribute the differences to personality characteristics of the teachers, but rather to the nature of the task that was influencing the leadership style of the teachers. He observed that when the second two teachers used whole-class recitation methods, their behavior as an authority figure looked like that of the first two teachers. In other words, it was the nature of the task that determined the authority style of the teachers, and not their particular personality characteristics.

Bossert's criteria for activity structures provided a framework for analyzing instructional activities in any given classroom. For the Junior High Transition Study done at the Far West Laboratory, Bossert's criteria were expanded to incorporate six dimensions of classroom instruction. These were: a) content of instruction; b) group size and composition; c) division of labor; d) student control; e) evaluation; and f) student advancement (Ward, Mergendoller, & Tikunoff, 1982). A brief description of each element follows:

1. Content of instruction. At a global level, content includes the designations given various time blocks during the school day, such as math, social studies, physical education, reading, and study hall or job periods. These terms convey general expectations regarding the topics and skills around which students' work will be organized during a particular time period. Content further includes the specific knowledge and skills to be applied and acquired during a particular work block and their relation to work activities across the school year.

2. Group size and composition. Grouping criteria concern the assignment of students to teachers for the purpose of carrying out classroom instruction. These data are drawn from each work group level: the school, the class, and smaller subgroups.

3. Division of labor. The division of labor activity structure is based upon the premise that the manner in which classroom work activity is structured will determine whether students work independently or cooperatively with others. Both types of behavior are desirable depending upon the objectives of various work activities.

4. Student control. Within some activity structures, students are required, or allowed, to control some aspects of their work. The amount and type of control delegated to students may affect the cognitive and interactional demands of the work activity and the learning outcomes derived by students as a result of engaging in that activity.

5. Evaluation. Teachers evaluate at least three aspects of students' participation: academic performance, adherence to school and class rules, and character. These evaluations may be stated publicly or privately, may be directed towards either an individual or a group, stress negative or positive aspects of performance, and may or may not suggest comparison to other students.

6. Student advancement. Interrelated with other activity structure elements is the extent to which a student is free to move ahead with a task, versus being dependent on others in order to (a) perform certain aspects of the work, (b) acquire and use certain materials, or (c) receive additional instruction. Student advancement is related to those observable factors or situations in the classroom that create student dependency on the teacher or others to complete work.

The focus of the Junior High Transition Study was on the relative success of various students in moving from elementary schools to junior

high or middle schools. These six activity structure elements were useful in gauging effects of the instructional organizations on the students' transition success (Ward et al., 1982).

Thus, these dimensions of activity structures, which Bossert and others have used to analyze classroom work activities, offer promising mechanisms for describing the organizational structure of any classroom. It should be noted, however, that work in the area of activity structures and their relation to student achievement is just beginning and that results so far have not been fully conceptualized or investigated. As an illustration of the complexity of the various activity structure elements, the following section will describe some current research in one dimension of the activity structure, grouping.

Grouping

Grouping is a traditional characteristic of classroom organization; students for years have been placed in homogeneous ability groups in reading and sometimes mathematics so that teachers can more easily match instruction to student need. The theory has been that student achievement would be greater if teachers did not have to instruct students with several abilities in the same group. Some researchers (Weinstein, 1976; Barr, 1975, 1980) have studied student achievement with regard to within class grouping arrangements, and have found that achievement in reading is, indeed, related to group membership. Barr identified pacing of instruction as an important factor to explain the difference. Students in faster groups go through readers more quickly and learn more new words, which results in more learning. High ability groups generally benefit from homogeneous grouping (Calfee & Brown, 1979). However, Good and Grouws (1977) found that grouping did not enhance achievement in mathematics classes. Good hypothesized that classes with groups were more difficult to manage effectively.

Some researchers have been concerned about the effects that grouping arrangements have on students with lower abilities. Weinstein (1982) described how teachers have higher expectations for high achievers and offer them more options than lower achievers. Several studies (Green & Smith, 1982; Allington, 1980) have documented that children in low reading groups receive more phonics instruction in phonics and less in comprehension than those in higher groups.

Although the trend of the research has indicated that within-classroom grouping benefits higher ability students and is detrimental to lower ability students, other work has suggested that there are no significant achievement differences between students who are taught as a whole class and those who are grouped (Filby & Barnett, 1982). Filby and Barnett examined whether differences in classroom grouping practices were associated with student learning, and used ALT and achievement scores as measures of learning. They found that, although the five classes examined provided clear contrasts in organization patterns for reading instruction (from whole-class instruction to small groups), organizational differences seemed to have relatively little effect on stu-

dent behavior, pacing of instruction, achievement, or self-perception. Filby and Barnett cautioned against generalizing from their findings. All of the teachers in their study were viewed as successful by personnel from the school district, and were comfortable using an organization arrangement that they believed worked best in accomplishing their objectives. Filby and Barnett hypothesized:

> It may well be that different approaches to teaching can be equally effective in the hands of teachers who work with skill and energy to carry them out. With less skillful teachers, the results might be different. If so, then we need to study how these teachers made their classes function so well (Filby & Barnett, 1982, p. 19).

Filby and Barnett are presently conducting research to determine what it is that these teachers do to make their classes so successful.

Grouping has also been used as a dynamic to encourage cooperative behavior among classmates as a way to promote learning. Several researchers have developed activities that teachers can use to facilitate student cooperation (Slavin, 1980; Cohen, 1979). Some of these activities require the participation of each group member in order to complete a task. It is important to note, however, that groups are not likely to succeed unless some leadership training is provided. Wilcox (1972) found that trained group leaders are better able both to encourage participation from all members and to complete a specified task. Studies have also demonstrated how specific training of low status group members have resulted in more equal deliberations among members in a small group (Cohen, 1979).

Preservice teachers would benefit from reviewing some of these materials to help them plan successful group activities. Managing a classroom with diverse activity structures is more complex than with a single group structure. Without the knowledge and application of some of these techniques, successful group activities are less likely to be accomplished.

Thus grouping and other elements of the activity structure have shown some potential for contributing to effective instruction. Yet there is obviously a need for further research into the relationship among various activity structure dimensions and their impact on student achievement.

Academic Learning Time

Much discussion in educational research in recent years has centered on concepts regarding the relationships between time and learning (Stallings & Kaskowitz, 1974; Wiley & Harnischfeger, 1974). Carroll (1963) pioneered in this area when he suggested that learning is directly related to time. He distinguised between the amount of time a student actually spends learning a subject and the amount

of time the student needs to spend on the subject. Stallings (1980) found that below average students require more time than average students to learn, while average students require more time than above average students. In a review of studies on instructional time, Cotton and Savard (1981) found that increasing the amount of allocated to instruction leads to increases in student achievement, especially when the amount of teacher-student interaction increases.

One of the most significant examinations of the time and learning issue was conducted by Far West Laboratory as part of the California Beginning Teacher Evaluation Study (BTES), which focused on teaching activities and classroom conditions that facilitate student learning in elementary schools (Fisher et al., 1980). The BTES identified three concepts related to time and learning: allocated time, engaged time, and academic learning time (or ALT). Allocated time represents the total amount of time allocated or available for learning--in a school day, during a class period, or in a particular content area. Engaged time is the time students are active in the instructional activity, either paying attention or working on the learning task; engaged time more accurately reflects student learning than does allocated time. ALT reflects both allocated time and engaged time with the added dimension of the student's accuracy rate so that ALT becomes a measure of student learning-as-it-occurs. It was the usefulness of ALT as a measure of student learning that encouraged the RUETE collaborative team to include academic learning time as an area of research concentration.

ALT is based on the premise that in order to examine the impact of classroom practices on student learning, it is necessary to obtain a measure of learning that can be related directly to classroom phenomena. Research (Fisher et al., 1978) has shown that ALT as a measure of student learning is more proximal to instruction than achievement test scores, can be observed during instruction, can be measured repeatedly, and is related strongly to student achievement.

ALT is specifically defined as the amount of time a student spends in a particular content area engaged in learning tasks at an appropriate level of difficulty. This concept represented a shift from earlier time and learning research (Carroll, J., 1963; Stallings & Kaskowitz, 1974; Wiley & Harnischfeger, 1974) in that it emphasizes the quality of the learning time rather than the amount of time spent on a learning task. In BTES (Fisher et al., 1980) defines the appropriate level of difficulty as one in which there is a high success rate, that is, a situation in which students have a good grasp of the relevant academic task and make few errors.

Classroom data indicated that maximum achievement in reading and mathematics is accomplished when students are given tasks in which they attain at least 75 percent accuracy; the maximum achievement is encouraged by the fact that the more success a student experiences, the more engaged he or she will become in the learning task.

The 75 percent success rate was a general figure arrived at by the BTES. More specifically, the BTES found that lower ability

students appear to benefit by experiencing a higher success rate (80 to 85 percent) and that higher ability students are aided by a lower success rate (about 70 percent). The same classroom data suggested that when students are given inappropriate tasks, the tasks are more likely to be too difficult than too easy. These data indicated that teachers need to design their instruction so as to avoid either boring students with tasks that are too easy, or frustrating them with tasks that are too hard. In other words, both boredom and frustration lead to lack of engagement and therefore lower achievement.

Conclusion

This synthesis of selected current research on effective instruction was prepared as part of the study on Applying Research to Teacher Education (ARTE), in particular for the facet of the study that is examining Research Utilization in Elementary Teacher Education (RUETE). The areas of effective instruction discussed here represent the research concepts considered relevant by the RUETE collaborating research team to its project of research utilization in teacher education programs. The particular research areas discussed were: teaching behaviors, with an emphasis on active teaching; the activity structure, including a special report on grouping; and academic learning time (or ALT).

Within the range of studies reported, those involving teaching behaviors in the direct instruction model, that is, active teaching, have made the biggest impact on the nature of inservice teacher training programs. Hundreds of districts have used Madeline Hunter's training manual, adapted from this research, as their main thrust of teacher improvement. The American Federation of Teachers has also developed a training manual that includes a translation of research findings and training materials which they use in workshops with their members. (This effort was recently awarded honorary distinction for service by the American Educational Research Association). Other districts are creating their own materials based on this research. The behaviors described as active teaching--which are characterized by teacher-directed learning and a high level of teacher-student interaction--have taken on such significance because they have been identified as effective in producing greater student achievement, and thus are considered a form of effective instruction.

Teacher-dominated instruction, however, is not the only way to facilitate learning. The discussion of the activity structure noted the suggestion by some researchers that the organization of instruction may influence student achievement as well as the social relationships within the classroom. Researchers have examined, for example, the effects of grouping on the achievement of lower ability and higher ability students. Ongoing studies, however, are indicating that what occurs within a group may be more significant than the grouping itself. Good (1983a) recently stressed that point in a paper presented at the

American Educational Research Association: "The form of organization structure alone has not, does not, and never will predict student outcomes" (p. 2). Research on the relationships among various activity structures and their implications for student achievement is new and so far inconclusive.

The third and last area of effectiveness research discussed here was academic learning time, a measure of student learning that incorporates the time allocated to a learning task, the time a student is engaged in the task, and the accuracy of the student in performing the appropriate or relevant task. ALT has been shown to be more proximal to instruction than achievement scores and therefore offers a promising gauge of effective instruction for use in the research activities of the RUETE project.

Obviously, the worlds of teaching practice and of educational research are complex. Teachers must design and implement appropriate instruction for each student in their particular classrooms. Researchers conduct studies to help practitioners become more effective in the classroom, but their findings are rarely definitive or easily translated into practice. A goal of the ARTE: RUETE project is to help shorten the distance between the communities of research and practice through the collaboration of researchers, teachers, and teacher educators. It is intended that such collaboration will encourage an exchange of information between researchers and teachers that will benefit student teachers in their preservice stage of training. Continued communication and collaboration between the two communities should result in improved practice in schools and more effective university teacher preparation programs.

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